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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/721,326	11/26/2003	Masaki Shiina	018842.1276	8425
24735	7590	12/30/2005		
BAKER BOTTS LLP C/O INTELLECTUAL PROPERTY DEPARTMENT THE WARNER, SUITE 1300 1299 PENNSYLVANIA AVE, NW WASHINGTON, DC 20004-2400			EXAMINER SAYOC, EMMANUEL	
			ART UNIT	PAPER NUMBER
			3746	

DATE MAILED: 12/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/721,326	SHIINA, MASAKI	
	<b>Examiner</b>	<b>Art Unit</b>	
	Emmanuel Sayoc	3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 26 November 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☒ Claim(s) 8-12 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>11/26/03</u> .  | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Specification*

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed. The title should refer to at least the principle inventive concept of the claimed invention. "A Swash Plate Compressor with Non-circular Pistons and Cylinders" is recommended.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-4 are rejected under 35 U.S.C. 102(b) as being anticipated by Burkett et al. (U.S. 5,421,243).

In Figure 1, Burkett et al. teach a swashplate compressor comprising a housing (12, 16, 18), a rotatable main shaft (20) extending in the housing (12, 16, 18), a swashplate (24) mounted on the shaft (20) and rotatable together with said the shaft (20), and a compressor unit (shown) adapted to carry out a suction process (suction chamber 58) and a compression process (compression chamber 26) for a working fluid as the swashplate rotates. The compressor unit includes a plurality of pistons (38)

arranged adjacent to one another in the rotating direction of the swash plate and adapted to reciprocate in an axial direction of the shaft (20) as the swashplate (24) rotates. A plurality of cylinder bores (26) are capable of individually receiving the corresponding pistons and guiding the pistons (38) in reciprocation in each cylinder bore (26) having a cross section formed of any other closed curve than a circle (see semi triangular shape of pistons and cylinder bores – Figure 2). The closed curve including curve elements and straight elements, each of the straight elements connecting each two adjacent curve elements – see examiner's marked up Figure 2.

The closed curve is triangular and includes a first curve element (C1) defining a base extending in a rotating direction of the swashplate (24) and a second curve element (C2) defining a top directed inward in a diametrical direction of the swashplate (24) and having a curvature radius smaller than that of the first curve element (C1).

The closed curve further includes third curve elements (C3) connecting with ends of the first curve element (C1) and having a curvature radius smaller than that of the second curve element (C2). The straight elements connecting the corresponding third curve element (C3) and the second curve element (C2) respectively.

The closed curve is oval and includes a first curve element (C1) defining a large end portion situated ahead as viewed in a rotating direction of the swashplate, a second curve element (C2) defining a small end portion situated behind as viewed in the rotating direction and having a curvature radius smaller than that of the first curve element (C1) and two straight elements connecting the first and second curve

elements (C1, C2) – see examiner's marked up Figure 2. The shape of the cylinder conforms with a rough oval.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Burkett et al., as applied to claim 1, and in further view of Hicks et al. (U.S. 5,013,219).

Burkett et al. set forth a device as described above, which is substantially analogous to the claimed invention. The compression unit includes a cylindrical outer

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shell (12), a metallic center sleeve (see radial bearings) located in the center of the outer shell and supporting said main shaft by means of a bearing (thrust bearings), metallic intermediate sleeves (38) arranged between the outer shell (12) and the center sleeve and individually defining the cylinder bores (26) inside. The Burkett device differs from the claimed invention in that there is no explicit teaching of a resin filler filling gaps in the outer shell. Hicks et al. teaches an analogous swashplate compressor with a valve housing (16), a bearing plate (20), swashplate (62), and in particular a cylinder housing (18) made of glass reinforced epoxy resin. This material is useful for its non-corrosive properties, ease in manufacturing, and light-weight properties. Therefore it would have been obvious to one of ordinary skill in the art at time the invention was made to modify the Burkett et al. device by, incorporating the resin filled cylinder housing, as taught by Hicks et al., in order to advantageously avail of the resin materials non-corrosive properties, ease in manufacturing, and light-weight properties.

With respect to the process of plastically deforming the sleeves, in MPEP 2173, Product-by-Process Claims, the determination of patentability is based on the product itself (not the process). The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior-art, the claim is unpatentable even though the prior-art product was made by a different process.

7. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Burkett et al., as applied to claim 1, and in further view of Steele (U.S. 4,790,727).

Burkett et al. sets forth a device as described above, which is substantially analogous to the claimed invention. Each piston (38) includes a cylindrical piston body (see cylindrical piston neck attached to 38) having an inner end situated in each corresponding cylinder bore (26) – see Figure 1. A piston head (38) is mounted on the inner end of the piston body. The Burkett et al. device differs from the claimed invention in that there is no explicit teaching of the piston having a piston ring mounted on the piston body. Within the art seal piston rings were well known to enhance the piston to cylinder seal in expansible chambers. Steele teaches a piston (120, 122) with seal rings in grooves (124, 126) that engage the cylinder (ex. 192). Therefore it would have been obvious to one of ordinary skill in the art at time the invention was made to modify the Burkett et al. device by, incorporating the seal rings, as taught by Steele, in order to advantageously enhance piston to cylinder seal. In the combination, the piston head (Burkett et al. 38) and the piston ring have a cross-sectional shape in conformity with the cross section of the cylinder bore (Burkett et al. 26) so that only the piston head (38) and the piston ring are slideable in contact with the cylinder bore (Burkett et al. 26) as the piston (Burkett et al. 38) is fitted in the bore.

***Allowable Subject Matter***

8. Claims 8-12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following references are cited to further show the state of the art with respect to swashplate compressors.

U.S. Pat. 5,211,101 to Letsch et al., 5,380,166 to Terauchi, and 1,436,177 to Krause – teach various compressors of non-circular piston arrangements.



***Contact Information***

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Emmanuel Sayoc whose telephone number is (571) 272 4832. The examiner can normally be reached on M-F 8-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy S. Thorpe can be reached on (571) 272-4444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Emmanuel Sayoc  
Examiner  
Art Unit 3746

ECS